

ABSTRACT

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2
3 An injection mold for manufacturing two-component elongated
4 members [particularly toothbrushes,] includes first and second mold
5 cavity members [which are] mounted for relative movement toward and
6 away from one another [to open and close the mold, respectively.
7 These cavity members are designed to have at least a portion of
8 each of them extend] through an open central frame which carries a
9 rotatable central mold plate in it. The central mold plate is
10 configured ^d to engage parts of the first and second mold cavity
11 members, which do not directly engage one another through the
12 opening in the frame. [In the operation of the mold, a pre-form is
13 formed on one side, between the first and second mold cavity
14 members extending through the frame, and between one of those mold
15 cavity members and the rotatable mold plate.] When the mold [then] is
16 opened, the rotatable mold plate in the central frame member is
17 rotated 180° to place [the] ^a pre-form on the opposite side of the
18 mold. [The mold then is closed, and the] ^{for injection of a} second component [is injected]
19 in [such] ^{the} opposite sides ~~x~~ of the mold. [After a new injection cycle
20 has been completed, the pre-form is simultaneously formed on the
21 first side of the mold and the finished product is formed on the
22 other. The mold again is opened.] The central frame moves one-half
23 the distance between the first and second mold cavity members; and
24 the rotatable mold plate is rotated 180° in each cycle. [The
25 finished product is ejected, so that a new pre-form can be molded,
26 as described above.]

1 suitable configuration used for two-component molding of products.
2 Such a machine typically includes a control panel 12 for
3 controlling its operation. In addition, plastic material for
4 injection into the mold cavities and the mold plates is supplied
5 through a pair of injection rams (one for each of the two different
6 components to be molded), one of which 14 is illustrated in Figure
7 1.

8 In Figures 1, 2 and 3, the details of the standard mold
9 blocks, including the manifolds, plastic delivery system, cooling
10 lines and the like, have been removed to show a diagrammatic
11 arrangement of the mold ^{blocks} [plates] or mold cavity ^{blocks} [plates] used in a
12 preferred embodiment of the invention for molding toothbrush
13 bodies. To accomplish this, a fixed mold block 18, carrying mold
14 plates 18^A and 18B for two separate manifold systems is provided.
15 The mold plate 18A is injected with the first material for a
16 toothbrush pre-form; whereas the second plate 18B includes a
17 manifold for injection molding the second material to form a two-
18 component toothbrush handle. Figures 4 and 10 illustrate these
19 different plate portions 18A and 18B most clearly; although they
20 are diagrammatically indicated in Figure 3B also.

21 In conjunction with the fixed mold block 18, there is a
22 movable mold block 16, again mounted on conventional apparatus in
23 an injection molding machine for movement toward and away from the
24 mold block 18 to close and open the mold, respectively. The mold
25 which is illustrated is a straight pull mold, which slides on four
26 pairs of guide pins located, respectively, at the two lower corners